DOCUMENT RESUME

ED 162 758 PS 010 280

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TITLE	Illness and Social Behavior in Infancy.
SPONS AGENCY	National Inst. of Child Health and Human Development (NIH), Bethesda, Md.
PUB DATE	Aug 78
GRANT	NICHHD-PO-HD09130
NOTE	16p.; Paper presented at the Annual Meeting of the American Psychological Association (86th, Toronto, Canada, August 28-September 1, 1978)
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	Day Care Services; Infant Behavior; *Infants; *Physical Health; Research; *Social Behavior; Teacher Behavior; *Teacher Influence
IDENTIFIERS	Illness

ABSTRACT

The effects of minor illness on infants' social behavior were studied among disadvantaged infants who attended a day-care program. Twelve infants aged 4 1/2 to 6 months were observed once while playing alone and once while interacting with their teachers each week for 6 weeks. A time-sampling procedure was used to record frequencies of vocalizations, visual regard, touching, toy manipulation and infant's crying. Infant health status on the days of observation was determined by a pediatrician who reviewed medical records after the observational data were collected. Paired t-tests were used to compare behavior while infants were ill and well. In the playing alone situation, none of the differences between ill and well conditions for any of the measures were significant. In the teacher interaction situation, during illness infants vocalized significantly less and were responded to by teachers significantly less than when the infants were well. Results suggest that mild illness had no effect on infants' behavior. Since the effects in the illness condition appeared only in the teacher interaction situation the change in infant vocalization may have resulted from changes in teacher behavior rather than illness. It is suggested that teacher expectations may lead to unnecessary reductions in the level of social stimulation when children are ill. (Author/RH)

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ED162758

Illness and Social Behavior in Infancy

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Paper presented at the annual meeting of

the American Psychological Association,

Toronto, August 1978

PS 010280

Abstract

Observations of 12 infants and their day-care teachers were made to study the effects of infants' health status on social behaviors. Infants were observed twice each week for 6 weeks between the ages of 4½ and 6 months, once while playing alone and once while with their teachers. A time-sampling procedure was used to record frequencies of vocalizations, visual regard, touching and infants' crying. Comparisons were made of behaviors observed when infants were well and ill, as determined by a pediatrician. When observed playing alone, infant behaviors did not differ while ill or well. During illness, infants vocalized less and were responded to by teachers less when observed in interactions with teachers. Infant behavior differed as a function of health status only during the interactions with teachers and not when alone. This suggested that changes in teacher behavior, rather than illness per se, were responsible for the change in infant behavior.

Illness and Social Behavior in Infancy

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Introduction

Early childhood illness has long been a focus of medical research in this country. Much is known about the physiological effects of acute, mild illness, but little information exists concerning psychological processes during periods of illness. Most of what is currently known about the effects of physical health on behavior has come from studies focused on cognitive and perceptual processes (Alluisi, Thurmond, & Coates, 1971; Thurmond, Alluisi, & Coates, 1971; Warm & Alluisi, 1967). In a unique study of infants, Haskins, Collier, Ramey and Hirschbiel (in press) found that learning, as measured by habituation performance, was adversely affected by febrile illness. However, afebrile illness had no effects on learning. During early childhood, infections caused by neurotropic agents, such as viral encephalitis, can cause deficits in intellectual growth which resemble the effects of severe brain lesions (Warm & Alluisi, 1967). However, at school age, the relationship between illness and academic performance is uncertain. Where adverse effects of illness have been found, it is possible they were due to alterations in the child's social relations with parents, teachers and peers rather than the disease directly (Warm & Alluisi, 1967).

Evidence of illness effects on social relations in childhood is extremely limited. Changes in social behavior following viral encephalitis and poliomyelitis have been reported in the literature (Warm & Alluisi, 1967). During preschool years age-related differences

in behavioral reaction to minor illness were described by Mattsson & Weisberg (1970). When ill, children age 2 became more dependent and irritable towards their mothers, whereas children between 3 and 4 became less interested in social interactions with their mothers. An important question is raised by these studies of illness and social behavior: "What is the caregivers' contribution to changes in children's social behavior during illness?" Effects of illness on children's social behavior might result from changes in the behavior of other persons towards them rather than from the illness itself. The present study addressed this question by observing the social behavior of both infants and their day care teachers during periods when the infants had minor illnesses and when they were well.

Method

Subjects

The infants observed in this study attended an early stimulation day-care program and were from disadvantaged families. Children were selected for the program because they were considered to be at risk for psychosocial retardation (Ramey, Holmberg, Sparling, & Collier, 1977). Children began attending the day-care center between 6 and 12 weeks of age. The program included full day-care for 50 weeks per year. Children received an educational curriculum, well-balanced nutrition, and routine health care at the day-care center.

Observations began when the infants were 4 1/2 months of age and continued for six weeks. The sample of 12 infants included 4 black females, 1 white female, and 7 black males. The caregivers in this study were the infants' day-care teachers and included 1 black male, 3 black females, and 1 white female.

Procedure

Behavior observations. Each week infants were observed while playing alone and also during curriculum activities and free play interactions with teachers. Data from the "playing alone" observations were used to examine illness effects that were independent of teachers' immediate behavior toward the infants.

In each observation the observer alternated watching for 5 seconds and then recording for 5 seconds for 10 minutes. Behaviors were recorded in their exact sequence of occurrence, preserving the identity of each actor. If an exchange of behaviors was in progress at the start of an observation interval, it was recorded as a simultaneous interaction to indicate that it was not possible to determine the initiating person or initiating behavior. Therefore, the analysis of sequential relations among behaviors was based only on exchanges in which the initiating person and act were clear to the observer. In essence, the observation method was a time-sampling of behavior sequences. A 5-second sequence of behavior was sampled every other 5 seconds.

The particular behaviors recorded for both teachers and infants were:

1. Visual regard--eyes directed towards the other person.
2. Vocalizations--voiced sound or word, excluding fussing and crying.
3. Touching--hand contact on the other person's body.

Two additional behaviors scored only for infants were:

4. Crying (or fussing)--high-pitched, continuous sound or low sobbing sound.
5. Manipulating toys--hand contact with a manipulable object, usually a commercially manufactured play object.

One behavior was scored only for teachers:

6. Holding--teacher has the child on his/her lap, in his/her arms or is physically supporting the weight and posture of the child. The latter case includes situations where the teacher has the child by the hands or arms and the child's feet are on the ground. Because none of the children could stand by themselves, this was considered to be holding.

The raw data were used to construct two derived measures of contingent responding. Teacher contingent responding to infants was computed as a percentage of all infant vocalizations which were followed by a teacher vocalization in the same 5-second observation interval. An analogous measure of infant contingent responding to teacher vocalizations was also computed.

Observer agreement was defined as both observers recording the same observation interval identically with respect to actors, behaviors, and sequence. Agreement was measured in 190 observation sessions and averaged 86.1% of all observation intervals (range across 12 infants was 80.0% to 91.2%).

Determination of health status. The infant day-care program is a part of a multidisciplinary, longitudinal research project to study educational intervention strategies for high-risk children. A major component of the overall program is a health research project. Therefore, routine health care is provided free of charge by staff pediatricians and extensive health records are available for each child. Information in the health records included results of clinical examinations as well as results of throat cultures to identify pathogens. In addition, rectal temperatures were taken in the morning and in the afternoon every day by the day-care teachers. Since it was the day-care teacher who

reported symptoms to the pediatrician for further examination, teachers usually knew which children were ill and well. Because observers were not part of the teaching staff, they were generally not aware of the child's health status. Health status, ill or well, was determined after the observational data were collected by having a staff pediatrician review the medical records for each infant for each day in the 6-week period in which observational data were collected. If the pediatrician had any doubts about a child's health status on a given day, data collected on that day were not used in the analysis.

The median number of illnesses per child was two, and the illnesses that occurred were upper respiratory infections, otitis media, coryza, gastroenteritis and pharyngitis. The mean rectal temperature during illness was 99.1° (range 98.8° to 99.6°) and when well it was 99.0° (range 98.5° to 99.5°). Thus, the illnesses were mild and afebrile.

Results

Illness scores for each subject were obtained by summing the frequencies for each behavior over all illness observations in the entire 6 weeks of observation. Sums were obtained separately for the "playing alone" and "interaction with teacher" situations. Similarly, well scores were computed separately for "playing alone" and "interaction with teacher" situations. All scores were converted to rates by dividing the sums by the number of 5-second observation intervals on which they were based. This normalizing procedure was necessary because the number of well and illness observations were not equal for any infant.

One child had never been ill during a "playing alone" observation and could not be included in the analyses of that situation. Therefore, statistical tests were performed separately for the "playing alone" and "interaction with teacher" situations. Paired *t*-tests were used to

compare behavior during illness and well observations.

Alone situations. In the alone situation, measures of the infants' vocalizations, crying and playing with toys were analyzed. Means for the measures are presented in Table 1. None of the differences between illness and well observations for any of the measures was significant.

Interactions with teachers. From the observations of infant-teacher interactions, scores for "visual regard of teachers" and "vocalizing to teacher", "touching teachers", "infant crying", and "contingent responding to teachers" were obtained for infants. For teachers, scores for "visual regard of infants", "vocalizing to infants", "touching infants", and "contingent responding to infants" were computed. Additionally, a score for "mutual regard", the rate of simultaneous infant-teacher visual regard, was calculated. Means for the measures are presented in Table 1.

Insert Table 1 about here

Statistical tests for visual regard behaviors during infant-teacher interactions revealed no differences when infants were ill and well for any of the visual regard measures: look at teacher, look at infants, and mutual regard. Physical contact, as measured by touching and holding occurred equally often during illness and well observations. Further, there was no difference in infant crying when ill and well during interactions with teachers.

The analyses of vocal interactions did reveal a pattern of differences as a function of infants' health status. During interactions with teachers, infants' total vocalizations were significantly

less when ill than when well, t (11) = 2.82, p <.01. Although infants responded contingently to teachers less often when ill than when well, the difference was not reliable and this difference probably reflects the overall decrease in infant vocalizations. In addition to the change in infants' vocal behavior, a significant change in teachers' contingent responding to infants' vocalizations was observed, t (11) = 2.54, p <.05. When infants were ill, teachers responded contingently to a smaller percentage of infants' vocalizations than when infants were well. However, as can be seen in Table 1, total teacher vocalizations did not differ across infant health states.

Discussion

The results of this study suggest that mild illness per se had no effect on infants' behavior. Cry scores indicated infants were no more irritable when ill than when well. Measures of toy manipulation and visual regard of teachers suggest illness did not affect infants' interest in either play materials or people. Interestingly, the effects of illness on infants' behavior appeared only in interactions with teachers. A number of facts strongly suggest that changes in teachers' behavior played a central role in the effects of illness on infants' social behavior. First, when observed alone, infant vocalization rates did not differ when ill and well. Second, teachers showed a decrease in contingent responding to infants' vocalizations when infants were ill. Given the previous research on the effects of adult reinforcement on infants' vocalizations (Rheingold, Gewirtz, & Ross, 1959; Weisberg, 1963) it is possible that the observed decline in infants' vocalizations was due to a decline in teachers' contingent responding to infants' vocalizations. Finally, it does not appear to be the case that teachers were responding to behavioral signals from infants to reduce stimulation levels. During interactions

with teachers, infants did not cry more when ill than when well, nor did they look at teachers or respond contingently to teachers less often during illness.

If the infants' behavior toward teachers did not signal they were ill, then the teachers' behavior might reflect a "self-fulfilling prophecy" phenomenon (Rosenthal & Jacobson, 1968). In spite of the similarity in infants' behavior across health states, teachers might have believed infants would be less interactive, or should be kept quiet and inactive to promote recovery. In fact, the difference in social interactions across health states was observed for the more active behaviors, vocalizations and contingent responding, but not for the more passive or quiet behaviors such as visual regard, touching, or holding. As a result, teachers did not encourage vocalizations through contingent responding as much when infants were ill as when well. Therefore, infants' vocalizations decreased as teachers expected. Teachers' expectations may have been based on their conception of the sick role, which, according to Parson's (1951) formulation, affords the sick person the privilege of being exempt from social role obligations. For infants this might mean they were not expected to reciprocate social behaviors with adults. One implication of the self-fulfilling prophecy behavior is that over many childhood illnesses, adults teach children the obligations and privileges of the sick role.

A second implication of these results is that there may be myths concerning the effects of illness on infants' social behavior. The myths may lead to unnecessary reductions in the level of social stimulation when children are ill. For children with chronic illnesses such social deprivation might have serious adverse consequences. Interdisciplinary research in psychology and medicine can test uncritically accepted beliefs.

As an example, Ramey, Zeskind and Hunter (Note 1) point out that fear of infection kept newborn premature infants separated from their mothers by the glass walls of the incubator and, therefore, at a disadvantage for establishing an affectional bond of attachment. When research showed that simple handwashing and gown procedures were adequate precautions, an untested assumption gave way to the possibility of employing parents as agents of intervention in the care of premature infants. Further research may help dispell other myths concerning illness and infant behavior.

Footnote

The authors thank Fred Henderson and Margaret Sanyal for their work in reviewing the medical records to determine infant health status. We also appreciate the help of Kathryn Wilson and Carolyn O'Brien who assisted in the collection of the behavioral data, and Ron Haskins for his review of the manuscript. This research was supported by Grant No. PO-HD09130 from the National Institute for Child Health and Human Development. Reprint requests should be sent to Neal W. Finkelstein, Frank Porter Graham Child Development Center, Highway 54 Bypass W., Chapel Hill, North Carolina 27514.

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Table 1

Infants and Teacher Behaviors when Infants were Ill and Well

	Ill		Well		Ill vs. Well		
	$\bar{X}$	Sd	$\bar{X}$	Sd	t	df	p
Infants							
Play Alone							
Vocalize	.21	.13	.21	.12	.10	10	NS
Cry	.14	.15	.09	.08	.82	10	NS
Manipulate toys	.64	.29	.68	.26	1.12	10	NS
Infant-Teacher Interactions							
Look at teachers	.01	.01	.02	.02	.66	11	NS
Total vocalizations	.15	.11	.20	.11	2.82	11	<.01
Vocalize in response to teachers' vocalization	9%	5.6	12%	7.6	1.52	11	NS
Touch teachers	.04	.03	.04	.06	.14	11	NS
Cry	.03	.03	.06	.05	1.45	11	NS
Mutual visual regard	.25	.09	.26	.11	.42	11	NS
Teachers							
Infant-Teacher Interactions							
Look at infants	.65	.12	.65	.12	.08	11	NS
Total vocalizations	.76	.13	.78	.06	.66	11	NS
Vocalize in response to infant vocalization	60%	21.5	78%	9.3	2.54	11	< .05
Touch infant	.22	.08	.21	.08	.11	11	NS
Hold infants	.23	.13	.22	.10	.18	11	NS

NOTE: With two exceptions, the scores in this table are rates obtained by dividing overall frequencies by the number of 5-second observations intervals on which they were based. The two exceptions are infant and teacher vocalizations made in response to a vocalization by their respective dyad partners. These scores are percentages.